

PATENT COOPERATION TREATY

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10/591680

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant's or agent's file reference BU-115Xq999 | FOR FURTHER ACTION | See item 4 below |
| International application No. PCT/US2005/007278 | International filing date (<i>day/month/year</i>) 04 March 2005 (04.03.2005) | Priority date (<i>day/month/year</i>) 04 March 2004 (04.03.2004) |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | |
| Applicant TRUSTEES OF BOSTON UNIVERSITY | | |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

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|-------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input checked="" type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

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| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70 | Date of issuance of this report 05 September 2006 (05.09.2006) Authorized officer Agnes Wittmann-Regis e-mail: pt06@wipo.int |
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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BOSTON, MA 02109

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REC'D 29 SEP 2005

WIPO

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------|
| Applicant's or agent's file reference BU-115XQ999 | | Date of mailing (day/month/year) 27 SEP 2005 |
| International application No. PCT/US05/07278 | | FOR FURTHER ACTION See paragraph 2 below |
| International filing date (day/month/year) 04 March 2005 (04.03.2005) | Priority date (day/month/year) 04 March 2004 (04.03.2004) | |
| International Patent Classification (IPC) or both national classification and IPC IPC(7): G06F 9/45, 9/44, 17/50; H03K 19/00 and US Cl.: 717/140, 106-107, 136-137; 716/1, 17 | | |
| Applicant TRUSTEES OF BOSTON UNIVERSITY | | |

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-8300 | Authorized officer Kakali Chaki Telephone No. 571-272-2100 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|

Form PCT/ISA/237 (cover sheet) (January 2004)

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US05/07278

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 7,11-14 and 24-28

because:

☐ the said international application, or the said claim Nos. _____ relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 7,11-14 and 24-28 are so unclear that no meaningful opinion could be formed (*specify*):

The claims are each improper multiple dependent claims.

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for said claims Nos. _____

☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

☐ has not been furnished

☐ does not comply with the standard

the computer readable form

☐ has not been furnished

☐ does not comply with the standard

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US05/07278

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-----------------------------------------------|-----|
| Novelty (N) | Claims <u>16, 30</u> | YES |
| | Claims <u>1-6, 8-10, 15, 17-23, 29, 31-34</u> | NO |
| Inventive step (IS) | Claims <u>NONE</u> | YES |
| | Claims <u>1-6, 8-10, 15-23, 29-34</u> | NO |
| Industrial applicability (IA) | Claims <u>1-6, 8-10, 15-23, 29-34</u> | YES |
| | Claims <u>NONE</u> | NO |

2. Citations and explanations:

Claims 1-6, 8-10, 15, 17-23, 29 and 31-34 lack novelty under PCT Article 33(2) as being anticipated by US 6,484,304 to Ussery et al. Ussery teaches a method for programming an accelerating coprocessor comprising the steps of accessing data reflective of programming requirements for a general area of applications (col. 4, lines 31-38), specific hardware characteristics and availability (col. 5, line 54-col. 6, line 3), and domain-specific policy information (col. 4, lines 34-39); means for creating an internal representation reflecting the operational characteristics (col. 5, lines 35-39), identifying the step by step hardware needs of the coprocessor (col. 5, lines 54-62), and permitting an application trained non circuit design trained user to enter instructions to achieve the accelerated performance (col. 5, lines 31-39).

Claims 20 and 34 lack an inventive step under PCT Article 33(3) as being obvious over US 6,484,304 to Ussery et al. Ussery teaches optimizing the functionality of the accelerating coprocessor (col. 7, lines 3-5) but does not explicitly teach the step of analyzing the processing speed of the multiple computation units. However, such a step would have been obvious to one of ordinary skill in the art to insure an optimal parallelization (i.e. all processors are working at as close to full capacity as possible).

Claims 16 and 30 lack an inventive step under PCT Article 33(3) as being obvious over US 6,484,304 to Ussery et al. in view of US 6,020,931 to Bilbrey et al. Ussery does not explicitly teach identification of bit demands but does teach optimization of the accelerating coprocessor (col. 7, lines 1-2). Bilbrey teaches identifying and manipulating bit width as a means for optimizing for a specific application (col. 20, lines 59-61). Accordingly, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include Bilbrey's bit width optimization as one of the optimization tasks taught by Ussery (col. 7, lines 1-2).

Claims 1-6, 8-10, 15-23 and 29-34 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US05/07278

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

The drawings are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 7 because: Some of the labels are unclearly marked. For example in figure 1A, many of the identification labels are hand drawn and appear to provide contradictory labels for the items (i.e. 20a and 20a -18b).